

Question 1

Let:

$$f(x) = x^3 - 6x^2 + 9x + 2$$

Find the absolute maximum and minimum values of $f(x)$ on the closed interval $[0, 4]$.

Question 1 - Solution

We are given:

$$f(x) = x^3 - 6x^2 + 9x + 2$$

Step 1: Find critical points

$$f'(x) = 3x^2 - 12x + 9 = 3(x-1)(x-3) = 0 \Rightarrow x = 1, 3$$

Step 2: Evaluate at endpoints and critical points in $[0, 4]$

$$f(0) = 2$$

$$f(1) = 6$$

$$f(3) = 2$$

$$f(4) = 6$$

Absolute Maximum: $\boxed{6}$ at $x = 1$ and $x = 4$

Absolute Minimum: $\boxed{2}$ at $x = 0$ and $x = 3$

Graph of the function on $[0, 4]$

